WHAT IS CLAIMED IS:

1. A semiconductor film, comprising:

a polycrystalline semiconductor film provided on a substrate having an insulating surface,

wherein nearly all crystal orientation angle differences between adjacent crystal grains constituting the polycrystalline semiconductor film are present in the ranges of less than 10° or 58°-62°.

2. A semiconductor film according to claim 1, wherein the proportion of the crystal orientation angle difference between adjacent crystal grains of 1°-10° or 58°-62° is 0.5-1.

3. A semiconductor film according to claim 1, wherein the polycrystalline semiconductor film is made of silicon.

4. A method of forming a semiconductor film, comprising the steps of:

forming an amorphous semiconductor film on a substrate having an insulating surface;

introducing a catalytic substance for accelerating crystallization into a surface of the

amorphous semiconductor film;

applying first energy to the amorphous semiconductor film to crystallize the amorphous semiconductor film into a crystalline semiconductor film; and

applying second energy to the crystalline semiconductor film so that nearly all crystal orientation angle differences between adjacent crystal grains are present in the ranges of less than 10° or 58°-62°, wherein the crystallinity of the crystalline semiconductor film is increased to be turned into a polycrystalline semiconductor film.

5. A method according to claim 4, wherein the first energy is heat energy and the second energy is strong light.

6. A method according to claim 5, wherein the energy density of the strong light is such that after irradiation of the strong light, the proportion of the crystal orientation angle difference between adjacent crystal grains of less than 10° or 58°-62° is highest.

7. A method according to claim 4, wherein the semiconductor film is made of silicon.

8. A method according to claim 4, wherein the catalytic substance is a metal selected from the group consisting of Fe, Co, Ni, Cu, Ge, Pd, and Au, a compound containing at least one of these metals, or a combination of at least one of these metals and a compound containing at least one of these metals.

9. A method according to claim 4, wherein the concentration of the catalytic substance at a surface of the amorphous semiconductor film is greater than or equal to $1\times10^{11}$ atoms/$cm^2$ and smaller than or equal to $1\times10^{16}$ atoms/$cm^2$.

10. A method according to claim 5, wherein the strong light is excimer laser light.

11. A semiconductor device, comprising a semiconductor film according to claim 1.

12. A display apparatus, comprising a semiconductor device according to claim 11.